

# Making sense out of polemics

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**Abstract.** We intend to draw attention to a topic in practical argumentation that is complex, unavoidable and of substantial consequence in social, political and economical terms: polemics. Our target is a rather frequent —and far from trivial— type of polemics, those that are generated around action proposals that affect public well-being. Our aim is to develop a framework to identify the argumentative components of an actual controversy and eventually provide means to intervene in the ongoing disputation. With that focus, in this paper we outline the basic elements of a conceptual framework that will allow us to map the topic and articulate some salient opportunities.

## 1 Introduction

In loose terms, a *polemic* (from the greek *πολεμικός*, “of war”) is an exchange of controversial opinions concerning a proposal that affects conflicting interests. On *prima facie*, what distinguishes polemics to other types of dialectical conflicts is the fluidity of the contentious issues and the apparent lack of compliance with common dialogical conventions. Such chaotic image of polemics has been a reason to dismiss it as a worthless endeavour, a “parasitic figure on discussion” or as a means to avoid agreement [6] p 382. However, one may take a more positive attitude and look into polemical debates where the disputation has objective impact in the world and one can make sense of the process albeit its actual complexity. This second type of polemics is the one we mean to study. This paper is an invitation to the ArgMAS community to participate in that study.

In this paper we argue that *polemics* is a research topic that we believe is promising, fertile, of value to society and within the scope of current work in argumentation in multiagent systems. Towards that end, we introduce some conceptual distinctions and outline in very rough terms some research opportunities that we think are of interest for the ArgMAS community.

We propose to start the study of Polemics with a *descriptive approach* whose goal is to provide a conceptual framework to make sense of an ongoing polemic. Such conceptual framework should allow the identification of those entities and those events in the real world that are relevant to a polemic; and provide a representation of the disputation process that serves to articulate arguments and dialogues —that involve those entities— in an intelligible way. The descriptive approach that we propose would entail the development not only of the formal artefacts involved in the intelligible representation of

polemics but also the technological artefacts that support the identification of relevant entities and the representation of an actual polemic that involves them, in an automated or semi-automated way.

This paper is a timid step in that direction. It is an invitation, the first strokes of an outline of a potential conceptual framework and a call to arms. It is organised as follows: First we motivate the topic in informal terms Sec. 2 and illustrate the type of polemics we want our framework to describe (Sec. 3). In Sec. 4 we propose the basic conceptual distinctions for formal framework to represent polemics. After a quick review of developments from the *ArgMAS* community that are relevant to this proposal (Sec.5), we enumerate some areas of opportunity in Sec. 6, and finish the paper with brief closing remarks.

## 2 Motivation

In everyday language, a polemic is an exchange of opinions —usually belligerent— in which individuals or organisations propose, defend or attack some action or opinion that these stakeholders find disputable. Since we want to stay away from an understanding of polemics as a “parasitic figure of disputation”, we propose to establish a *restricted notion* that allows for a good description of the disputed issues and the argumentation involved. We propose to restrict a polemic to be a public exchange of dialogical arguments around a commitment to perform actions towards a particular outcome. Consequently, in loose terms, we assume that the statements are controversial —therefore, may be attacked or defended— and that the exchange is not subject to an agreed upon protocol, however we presume that some statements may be reified as a coherent disputation or dialogue. We presume that the action proposal is made within the context of a public policy that is active and whose stakeholders are bound to its observance. For that reason we do assume that for some statements to be effective in the polemic, the identity of some agents is true and known. However, we do not assume that those who participate in a polemic are bound to a code of honour, truthfulness or logical consistency.

In other words, we assume that a polemic has the following distinctive features:

- it involves several positions in conflict;
- several controversial issues may be debated at a given point of the polemic and in their disputation several types of dialogue may be intertwined;
- dialectical exchanges happen within an institutional framework that involves norms, regulations, organisations, individual and collective roles, ...;
- the main polemical issue changes over time;
- dialectical exchanges are affected by “reality”, mainly because time passes and events —that may be directly related to the polemic (a riot, regulation) or extraneous (a natural disaster)— happen;
- the outcome of the polemic has real consequences (for example, as a consequence of an ongoing polemic the construction of an airport is suspended or the airport is constructed) and, moreover, some dialectical exchanges that take place during the polemic may also have a real consequence (a threat to call a demonstration may force the resignation of public officers).

We claim, first, that the topic is **fertile** because those distinguishing features we mentioned are amenable to clear formulation and eventually to proper formal and technological treatment.

Secondly, we claim the topic is **challenging** because of the complexity of those features that distinguish polemics from conventional disputation involve substantial innovation as well as non-trivial extensions of current state of the art in argumentation theory and its technological support.

We also claim that the topic is **relevant** for the *ArgMAS* community because of two reasons that we shall address in Sec 6. First, that the community has several tools and techniques that may be extended to address those challenges that are peculiar to polemics; second, because some of those challenges are close to recent concerns and efforts of the ArgMAS community.

Our proposal is guided by the will to develop **two complementary outcomes**, in one hand, a *conceptual framework* to make a polemic intelligible to those individuals who observe or participate in it and, on the other hand, the development of *technological artefacts* that facilitate the interpretation of an on-going polemic and eventually articulate and facilitate the participation in it, in real time.

Finally, we claim that the effort is **of value to society** because: (i) polemics are frequent and unavoidable in a democratic society; (ii) polemics have an impact on several individuals and sometimes this impact can be serious; (iii) polemical disputations usually requires the investment of substantial social energy and may therefore entail important direct and opportunity social costs.

### 3 Examples of polemics

In order to motivate and illustrate some components of our framework, we will use a toy version of the polemic inspired by the London Shard Tower.<sup>3</sup>

Picture a polemic that starts when the city government of a large city—like London—with an emblematic location —like Hyde Park— announces that it has decided to sell the location to a group of foreign investors that want to build a one thousand meter tall skyscraper, the tallest ever. Let's call this proposal  $\mathcal{S}$ .

The *announcement* of  $\mathcal{S}$  is *officially* made public (perhaps in the government gazette) and includes (i) the *grounds* (the city is broke;  $\mathcal{S}$  will bring enough income to save the city finances and will foster local growth and employment; the city council is entitled to sell the land) and (ii) *warrants* (the list of norms and regulations that validate the entitlement) for the decision. The moment the public becomes aware of  $\mathcal{S}$ , there is a strong and confusing social reaction both in pro and against it. There is a realisation that *key information* about the building project is lacking and several *stakeholders* — for instance, legislators, spokespersons for the judiciary system, mayoral employees, land developers, political and special interest groups and associations, citizens that find their interests affected— are brought into the debate.

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<sup>3</sup> Manuel Appert, Skyline policy: the Shard and London's high-rise debate, Metropolitiques, 14 December 2011. <http://www.metropolitiques.eu/Skyline-policy-the-Shard-and.html>

After a flurry of public statements, newscasts, editorials and *twitts*, the debate settles around a few main *issues*: transparency of the decision, relevance of the purported warrants, actual economic benefits of the project, effect on the environment and the urban landscape, tradition and patriotic feelings, alternative solution to the financial problems of the city. Stakeholders adopt *positions* in favour or against those issues and propose and take different *actions*: for example, bring suit against officials for breaking a law, request environmental impact assessments, publish editorials and in-depth studies, convene demonstrations, ...

Evidently, in many cases polemical exchange is not a standard argumentation process. Not infrequently, public statements are made and social actions are taken with the intention of forcing the dispute into institutional terms that could be resolved in an aseptic legal context (e.g. demand that an environmental impact assessment has to be submitted because some regulation says so). However, this is not always possible or convenient for stakeholders who take to deception, hinting at corruption, threatening to bring suit, calling for a strike, in order to make stakeholders positions shift; and thus force changes upon rivals that would be unnecessary or even questionable from a strict institutional perspective. Moreover, supporters and antagonists of the proposal may open several argumentation lines that may not be resolved institutionally. Hence, at some points of a polemic, the argumentative threads that are active may be numerous and also thoroughly intertwined. Notwithstanding such argumentative complexity, in polemics like this one, the emotional and eristic content of the disputation is a key *rhetorical component*.

Although, this example is somewhat contrived, actual polemics are not all that different in flavour, content, structure and opacity for participants and observers. This can readily be seen in well documented real cases, for example in the following two classes:

1. Contentious projects for public works that comport significant economic or social consequences. For instance, (i) The proposal to build the Franklin-Below-Gordon dam, that was cancelled in 1983 after a five-year polemic involving one of the most significant environmental campaigns in Australia<sup>4</sup> (ii) The turbulent construction of Narita airport in Japan (1966-1982)<sup>5</sup> or (iii) The construction of the Keystone Pipeline System in the US.<sup>6</sup>

2. Political quarrels associated with demands that involve major practical consequences for the general population or to a particular community. For example, (i) the Scottish and the Catalan claims to call a referendum<sup>7</sup>; or (ii) the Greek debt crisis.<sup>8</sup>

How can a citizen or a stakeholder make sense of what is in question? What is at stake? Who holds what position and why? And more importantly, what should this per-

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<sup>4</sup> [http://en.wikipedia.org/wiki/Franklin\\_Dam\\_controversy](http://en.wikipedia.org/wiki/Franklin_Dam_controversy)

<sup>5</sup> [http://en.wikipedia.org/wiki/Narita\\_International\\_Airport#Construction](http://en.wikipedia.org/wiki/Narita_International_Airport#Construction)

<sup>6</sup> [http://en.wikipedia.org/wiki/Keystone\\_Pipeline](http://en.wikipedia.org/wiki/Keystone_Pipeline)

<sup>7</sup> [http://en.wikipedia.org/wiki/Scottish\\_independence\\_referendum,\\_2014](http://en.wikipedia.org/wiki/Scottish_independence_referendum,_2014) and [http://en.wikipedia.org/wiki/Catalan\\_self-determination\\_referendum,\\_2014](http://en.wikipedia.org/wiki/Catalan_self-determination_referendum,_2014)

<sup>8</sup> [http://en.wikipedia.org/wiki/Greek\\_government-debt\\_crisis](http://en.wikipedia.org/wiki/Greek_government-debt_crisis)

son do when given an opportunity to influence upon the question? Currently, significant polemics like the ones just mentioned, become intelligible *ex-post* and off-line and only through ad-hoc socio-economic-historical analysis. We presume that it is feasible and worthwhile developing conceptual tools that help identify the building blocks of the polemic and how these become articulated as the controversy progresses. Moreover, we also presume that it is feasible and worthwhile to develop technological tools that profiting from those, facilitate the intelligibility of this type of collective process.

## 4 Sketching a conceptual framework for polemics

As suggested in Fig. 1, we propose to understand a polemic as a phenomenon that happens within an institutional framework and may be observed from three interrelated levels of abstraction. In what follows we shall look into these elements in some detail.

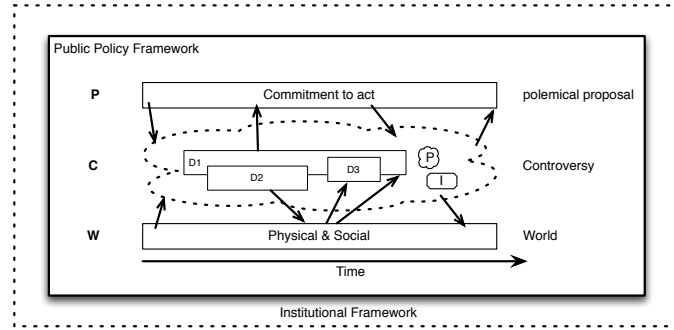


Fig. 1: A Polemic as a three layer process within an institutional framework

### 4.1 The institutional framework

The examples of the polemics we mentioned above presuppose an institutional context that includes: (i) a set of explicit norms that forbid, allow or oblige certain actions under given circumstances, (ii) a set of established procedures that have to be followed in order to accomplish some results (for instance, procurement regulations, conflict resolution procedures, validation an environmental impact assessment, etc.), (iii) stockholders with legitimate entitlements to intervene in the polemic, and (iv) a legal system that takes care of legal interpretation and enforcement.

In our proposal we want to include an institutional context but narrow it down in order to constrain the polemic within the bounds of a public policy. This way we can represent the public policy as an institution [13, 14, 19], so that we may count on clear warrants for entitlements of some clearly established roles, the essential regulated standard procedures and the corresponding enforcement mechanisms. Thus, loosely speaking, the public policy institution involves norms, procedures, regulations, roles, organ-

isations (political parties, unions, NGOs,...), governance devices (due process, law enforcement mechanisms,...), social practices, social norms, adequacy metrics, and values. In some cases (like a referendum for independence) the institutional context of the public policy may become itself part of the polemic and in such cases one would make reference to institutional frameworks of higher legal rank that contain it (e.g. constitutional, supranational).

## 4.2 Three levels of abstraction and their relationships

We hold that a polemic involves three interrelated spaces: The polemical proposal (P), the controversy about that proposal (C) and the relevant facts, events and actions in the physical world (W). These are immersed in a core institution, the public policy framework that restricts and conditions the polemic, which in turn is immersed in a wider institutional framework that conforms society and pertinent reality (Fig. 1).

*Level P: The polemical proposal.* This level consists of a declaration  $\delta$  by a legitimate stakeholder of the commitment to carry an action towards an ostensible goal. It is conditioned by the public policy institution. It may evolve as a result of the controversy and may eventually be withdrawn, made impossible or accomplished. In our example,  $\delta$  is  $\mathcal{S}$ , which starts the polemic and evolves as the polemical exchanges forces the city council to change it.

*Level C: The controversy.* Contains speech acts that are organised into *dialogues* which in turn give rise to *issues* and *positions* [20, 21].

In our example, a news editorial may draw attention to the potential impact on the city skyline, thus involving stakeholders like urban planners, architects and public figures into a number of “dialogues” over this issue. One dialogue may be a negotiation amongst authorities, constructors and detractors over the profile of the tower; another dialogue might be to elucidate the details of the financial aspects of the project, while an eristic dialogue may arise to bring the major down.

Dialogues may be of different *types*: eristic, deliberation, negotiation, inquiry, persuasion, information seeking [21] (as is in our example) that involve *arguments*. Arguments are either *atomic* or not. Atomic arguments are speech acts that correspond to an event or action that takes place in level W. Non atomic arguments have a basic structure that includes four types of components a *claim* which is sustained by the other components: *grounds* (premises, atomic arguments, other claims), *warrant* (inference, pertinence, norm or regulation, ...) and qualification (certainty, number, power,...) (Fig. 2) whose actual content depends on the type of dialogue [20].

Claims —that have been established by dialogues or an acknowledged event— may be organised as *issues* (which may give rise to new dialogues) and *positions* with respect to  $\delta$  that are backed by stakeholders who become (in principle) committed to those claims (modulo, tricking, disloyalty, lying or other dialogue defeating practices).

Dialogues are usually *intertwined* and not always neatly interleaved. The reason for this being that grounds, warrant and qualification are supported by events (which take place in Level W) and claims. Claims, in turn, are usually sustained by or become relevant for other dialogues (Fig. 3). Walton [22] addresses the problem of dialogue

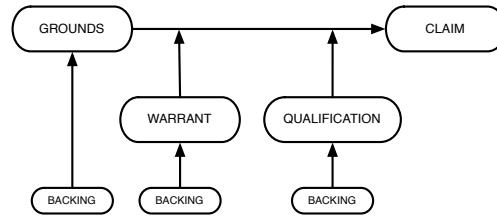


Fig. 2: Basic argument structure (after Toulmin)

shifting and embedding, features that are certainly part of this intertwining; however the structure of polemical arguments may be messier because of the forward and backward branching connections between claims, the intervention of several parties in the different dialogues and the concomitance of dialogues that share claims or parties.

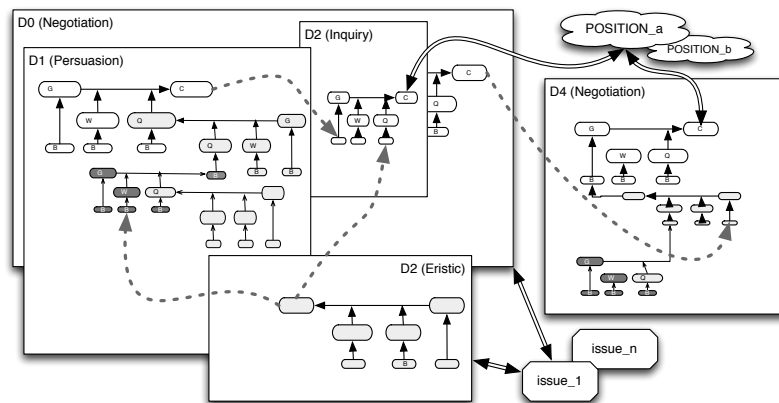


Fig. 3: Interleaving of dialogues. Claims sustained in one, may be used in other dialogues or become “commitments” for some stakeholder’s position

*Level W: The world of actual individuals, facts, events and actions.* This includes, firstly, individuals who actively participate in the polemic, playing individual or collective roles, and have direct interests in the consequences of  $\delta$  and its derived effects in the world. Secondly, there are physical facts, events and actions that are of two kinds: those that are a consequence of exchanges in C and those that happen independently of C but become relevant for C because they are used in a dialogue. We recognise as elements of W those physical objects that may be reified as claims or dialogical moves: newspaper articles, expert opinions, impact assessment reports, putting someone in prison, a demonstration. Notice that passage of time is of significant consequence in a polemic

because actions and commitments may depend on a timely execution (e.g., procedures may impose deadlines).

### 4.3 Interrelationships among levels

The three spaces are interrelated through a complex type of “counts as” relationship [19, 9].

1. From C to P, there needs to be a valid claim  $\kappa$  (in C) that is consistent with  $\delta$  and is admitted by the issuer of  $\delta$  or another equally or more qualified individual. When  $\kappa$  is taken into account and properly declared,  $\delta$  is changed into a new proposal  $\delta_n$  that leads the polemic from then onwards. In our example, for instance, the major may be forced by a judge’s ruling to modify the height of the tower, thus changing  $\mathcal{S}$  into  $\mathcal{S}_n$ .
  - Although the change of  $\delta$  may be forced by a proper argumentation process — the judge comes to the ruling that forces  $\mathcal{S}_n$  through due process— the issuer of  $\delta$  may be forced to change it because of the rhetorical situation produced by an eristic dialogue or, in many cases, by mere accumulation of claims by significant stakeholders around a particular issue. For instance, expert reports, newspaper articles and a demonstration around the environmental impact of  $\mathcal{S}$  may motivate the major to declare  $\mathcal{S}_n$  even when it is not compelled by a norm.
  - This is a noteworthy aspect of polemical argumentation that is not accounted for in classical dialectics. Claims, positions and changes in the main proposal may change because of rhetorical force of arguments; and that rhetorical force is not necessarily reflected in a proper dialogue or standard argumentation schema. However, in polemical disputation sometimes rivals want to force some issues into an argumentation process that is properly enforced, and therefore invoke established procedures —and the corresponding dialectical rules— that are part of the institutional framework to reach settlements on those terms.
  - The motivation for that and other types of strategic behaviour is perhaps also an aspect of polemics that is worth studying.
2. From P to C:  $\delta$  and  $\delta_n$  are regular speech acts but in order to exist in level C, they need to be grounded in W, so that the speaker has authority, and the contents of  $\delta$  and  $\delta_n$  are consistent with the current state of the world.
3. From W to C. Events and actions ( $\alpha$ ) in W are labelled as speech acts  $\phi$  that come into C as atomic arguments when they are deemed pertinent for a dialogue or a position by an entitled stakeholder. Notice, however that the same  $\alpha$  may be (mis)labelled as more than one speech act  $\phi_i$  in C when interpreted by different stakeholders with different rhetorical intentions in mind. Thus, a demonstration  $\alpha$  may be interpreted by a newspaper as an atomic argument—a “very large number of citizens” —against the issue *size of the building* and labelled  $\phi_1$ , and the same demonstration may be labelled  $\phi_2$  by the major as a failure of the opposition to prove enough popular support against  $\mathcal{S}$ .



4. From C to W. As Searle and Sergot & Jones ([19, 9]) state, institutional actions (speech acts) may produce facts or events in W, that in turn may trigger other events that may be brought into the polemic as new speech acts. A threat by a prominent environmentalist to call for a demonstration ( $\phi$  in C) is picked up by a reporter and published ( $\alpha$  in W) and sympathisers react to the news by organising a march ( $\beta$  in W) that is brought into C as a new atomic argument  $\psi$ .

## 5 Some related work

The Research Challenges for Argumentation Workshop held in Dagstuhl in 2008, [5], made an important contribution sketching some of the new argumentation research areas and projects being developed since then related to the context of the world wide web new applications and research trends, like semantic web, social networks, crowd computing. In the area of Web Semantics, a significant work has been done around the definition of a core ontology of argument related concepts, the Argument Interchange Format, AIF [15], [4]. This ontology has been used in the design of multiusers open argumentation systems based in multiagent technology [23], [2].

In areas of social networks and crowd computing, several collaborative web based versions of one user argumentation systems have been presented in recent years. Basically there are systems for deliberative argumentation, covering different aspects of the main options of such type of dialog. Among the systems designed to organize open deliberative massive discussion, at least two systems have been used in large debates: Debategraph<sup>9</sup> and Deliberatorium [10]. Both systems allow open deliberations based on visual maps about complex issues.

In a recent paper Walton et.al. [24], propose a new deliberation model for open settings on the web. In this paper they extend the Deliberation Dialogue Framework (DDF) model of McBurney et.al. [12], to include two major issues of real deliberation processes. The first issue is about changes in time. During a real deliberation process, circumstances can change, as well as new information can be obtained. The main issue here, from our point of view, is that deliberation is an open process that evolves over time as a result of changes in the environment and the availability of new information. The DDF model conceives as part of the deliberation process the embedding of information seeking and persuasion dialogs. In their proposal Walton et. al. introduce the possible changes in information during a deliberation as the result of the information-seeking phase. The second extension they propose to the DDF model, is the definition of a set of criteria to determine if a deliberation ends successfully or not.

The Carneades [7] system is designed for legal applications dealing with deliberation processes in public policy. It differs from Deliberatorium [10] particularly because it is not design to harvest the collective wisdom like Deliberatorium, but instead, its aim is to facilitate the understanding of complex legal issues on public policy for non-specialists. This translation is made by specialists or trainee people, while the participation of common citizens is mainly through their participation in polls. A new version of Carneades system provides web-based collaborative tools to help different kind of users

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<sup>9</sup> <http://debategraph.org/home>

to work on legal argumentations through a central database of arguments graphs and a set of different tools for modeling argumentation schemes, construct argument graphs, navigating argument graphs, participating in polls, etc.

## 6 Areas of opportunity

As suggested before, polemics is an important topic in the daily life of society and deserves to be studied from a multidisciplinary approach where argumentation, agent and multiagent technologies could play a key part. The complexity of scenarios in social polemics may be seen as an inviting area of opportunity to develop new theories and new technologies around an unavoidable social phenomenon. To achieve this complex task we list below some of the challenges we find evident and put them in the context of the related work.

1. *Make the framework precise.* Starting from some well documented real case studies, a theoretical framework should be drawn to represent a polemic properly — providing elements to identify events and speech acts, and their interrelationships as recurrent patterns or schemes; and to bring support to socio-cognitive systems that may serve individuals to participate in an on-line polemic.<sup>10</sup> Along these lines we may want to explore other notions akin to polemics that restrict or extend the framework or for which a more practical or useful labelling or automation is feasible.
2. *The role of time.* Time is one of the main components of polemics. It is also one of the main differences with most of the work done till now in argumentation [20, 22, 18]. Polemics are extremely dynamic phenomena; many things are occurring concurrently at different levels, events as technical evaluations, court processes, or a demonstration can have different life cycles, and the debates of each one of the different issues of the polemic has its own dynamic. The duration of a demonstration is much shorter than the construction of a Tower or a lawsuit process. As above-mentioned, in a recent paper Walton, Toniolo and Norman, [24], address the need of taking into account the importance of the dynamics of changes in the available information in the deliberation process. It is an example of how real problems produce new insights.
3. *Understanding the institutional framework.* In the context of polemics we need to understand how the institutional framework works. Can a public policy be understood as an institution? We claim that the approach of Searle to the constituent concepts of an Institution such as the collective assignment of function, and the collective assignment of a status such as “X counts as Y in context C”, can be useful to understand the highly complex situations arising in a polemic scenario [19]. For example, after a demonstration a group decides to assign the status of their

<sup>10</sup> For example, one might say that a  $\delta$  in P is a commitment  $C_{stit} < \alpha, authority, \sigma, \pi >$  by an individual  $\alpha$  with institutional power to establish the commitment to see to it that a state of the world  $\sigma$  is achieved through a plan  $\pi$ . In which case, an attack to  $\delta$  would be an attack to  $\sigma$  or an attack to  $\pi$ , and  $\delta$  would change into  $\delta_1$  if and only if one such attack succeeds and the institutional framework compels the change.

spokesperson to Jane. So by the use of the collective assignment function: X counts as Y in context C, they agree on the collective commitment (see for example [8]). Institutional framework includes the mechanism to deal with social disputes like the rules of the civil law. We could think that within this framework any dispute should be processed and solved. Unfortunately, social life is more complex and, even if there is an ongoing litigation in court, you may have other related events, in W, and social argumentations, in C, at the same time. We could say, in some sense that polemics assemble the institutional and social disputes. How are these two worlds related? This is one of the main issues to apprehend if we want to be able to create some tools to make easier the understanding of a Polemic.

4. *Argumentation theory.* Argumentation theory provides the core ideas for the framework we propose. For instance, in the context of a polemic the defeasibility of reasoning should be rule [20, 21]. The dialectical shifts and dialogs embedding discussed by Walton [21] should be studied in this new type of argumentation environment. An interesting question is how these relationships among different types of dialog work in multilateral controversies, where the events level W affect the dialogical exchanges in C (and viceversa). A huge demonstration against the tower construction project could be interpreted as a rhetorical situation [3] that might have an impact on the controversy level. What is the role of rhetoric in Polemics? Another classical issue in argumentation is *fallacies*. In this new scenario one should study how classical fallacies behave in on-line polemics and whether new types of fallacies appear. Polemics add complexity to the classical argumentation framework that should provide grounds for innovation.
5. *The use of new trends on Argumentation and Multiagent systems research.* As mentioned in the related work section the new trends outlined in Dagstuhl Manifesto [5], are now well established research topics: argumentation and the semantic web [4, 16, 15, 23]; argumentation and decision support in application [17, 11]; argumentation and multiagent systems [18, 1]; and argumentation and social networks [11]. We find that all these areas play a role in polemics, and polemics would constitute an appropriate ground for innovation in those fields.
6. *Tools.* Our aim is to develop a framework to make a polemic intelligible to those individuals who observe it or participate in it. Much work should be done integrating the lessons learned in projects like Deliberatium, Carneades and Debategraph and to build new ones to deal, for instance, with the labelling of the commitments and positions during the controversy. Since our aim is to build artefacts that should help citizens to be aware and understand the state of a polemic on line, those aspects of information design, usability and ergonomics in general must be focal points for future work.

## 7 Closing remarks

Our intention in this paper was to motivate the topic of polemics and give a taste of the type of formal and technical challenges that are open. This is evidently a topic for multidisciplinary approaches in which agent-based systems may play a synergetic role. It is also a topic where questions of remarkable complexity are open and many more shall be.

Our first concern is to develop the means to identify those elements that are relevant in a controversy and provide means to organise these. In addition, we propose to explore the construction of technological artefacts that may support identification and organisation of those relevant elements.

We made an attempt to identify salient challenges that this problem domain rises. We provided some indication that these challenges may be adopted by the computational dialectics community, partly because some of the concerns we have expressed are also in the mind of some colleagues but also because we understand that much of what remains to be done may very well build on what is available in classical dialectics and informal logic, and also on what has already been developed by the ArgAS community along the lines of agent-based argumentation, agreement technologies and socio-cognitive systems.

We want to apply these conceptual and technological tools to real controversies. We are aware of the complexity of that objective but we are aware also of the social significance of making sense out of the apparent chaos of a real polemic. Hence, in addition to the richness and challenging features of this problem we want to stress the fact that we are looking for a practical as well as altruistic objective: a way to empower citizens. The ArgMAS community is particularly well positioned to contribute to this end.

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